Socially-aware management of new overlay applications traffic - The optimization potentials of the SmartenIT approach

Wajda, Krzysztof ; Stankiewicz, Rafal ; Dulinski, Zbigniew ; Hoßfeld, Tobias ; Seufert, Michael ; Hausheer, David ; Wichtlhuber, Matthias ; Papafili, Ioanna ; Dramitinos, Manos ; Cruschelli, Paolo ; Soursos, Sergios ; Lapacz, Roman ; Stiller, Burkhard

Abstract: Today's overlay-based mobile cloud applications determine a challenge to operators and cloud providers in terms of increasing traffic demands and energy costs. The social-aware management of overlay traffic is a promising optimization approach, which shows potential for improvements by exploiting social information. This paper identifies key stakeholders and their roles in the service provisioning value chain and outlines major markets and optimization potentials. Accordingly, two scenarios are developed: the end user focused scenario aiming at increased QoE for end users, and the operator focused scenario targeting at the highest operating efficiency in terms of low cost and high revenue for the operator. The energy efficiency plays a major role as a key performance metric in both scenarios. SmartenIT's socially-aware management approach is illustrated based on two example mechanisms for traffic optimization: the home router sharing mechanism (HORST) on the end user side, as well as the dynamic traffic management mechanism (DTM) on the operator side. The paper is concluded by a first sketch of SmartenIT's architecture and its mapping to the two scenarios

Springer Link

Chapter

Mobile Networks and Management

Volume 141 of the series *Lecture Notes of the Institute for Computer Sciences, Social Informatics and Telecommunications Engineering* pp 290-300

Date: 28 February 2015

Socially-Aware Management of New Overlay Applications Traffic - The Optimization Potentials of the SmartenIT Approach

- Krzysztof Wajda
- , Rafał Stankiewicz
- , Zbigniew Duliński
- , Tobias Hoßfeld
- , Michael Seufert
- , David Hausheer
- , Matthias Wichtlhuber
- , Ioanna Papafili
- , Manos Dramitinos
- and *4 more*
    - , Paolo Cruschelli
    - , Sergios Soursos
    - , Roman Łapacz
    - , Burkhard Stiller
    - *Show less*

Abstract

Today's overlay-based mobile cloud applications determine a challenge to operators and cloud providers in terms of increasing traffic demands and energy costs. The social-aware management of overlay traffic is a promising optimization approach, which shows potential for improvements by exploiting social information. This paper identifies key stakeholders and their roles in the service provisioning value chain and outlines major markets and optimization potentials. Accordingly, two scenarios are developed: the end user focused scenario aming at increased QoE for end users, and the operator

focused scenario targeting at the highest operating efficiency in terms of low cost and high revenue for the operator. The energy efficiency plays a major role as a key performance metric in both scenarios. SmartenIT's socially-aware management approach is illustrated based on two example mechanisms for traffic optimization: the home router sharing mechanism (HORST) on the end user side, as well as the dynamic traffic management mechanism (DTM) on the operator side. The paper is concluded by a first sketch of SmartenIT's architecture and its mapping to the two scenarios.

Keywords

Application-layer traffic optimization Economic traffic management Social networks QoE Energy efficiency Inter-cloud communications

References

1. Seufert, M., Burger, V., Hoßfeld, T.: HORST - home router sharing based on trust. In: Social-aware Economic Traffic Management for Overlay and Cloud Applications Workshop (SETM 2013), in conjunction with 9th International Conference on Network and Service Management (CNSM), Zurich, Switzerland, October 2013

2. Cisco Systems White Paper: Cisco Global Cloud Index: Forecast and Methodology 2011–2016 (2012)

3. Mell, P., Grance, T.: SP 800–145. The NIST Definition of Cloud Computing, National Institute of Standards & Technology (2011)

4. Wichtlhuber, M., Heise, P., Scheurich, B.: Hausheer, D: Reciprocity with virtual nodes: Supporting mobile peers in Peer-to-Peer content distribution. In: Social-aware Economic Traffic Management for Overlay and Cloud Applications Workshop (SETM 2013), in conjunction with 9th International Conference on Network and Service Management (CNSM), Zurich, Switzerland, pp. 406–409, October 2013

5. Duliński, Z., Stankiewicz, R.: Dynamic traffic management mechanism for active optimization of ISP costs. In: Social-aware Economic Traffic Management for Overlay and Cloud Applications Workshop (SETM 2013), in conjunction with 9th International Conference on Network and Service Management (CNSM), Zurich, Switzerland, pp. 398–401, October 2013

6. Biancani, M., Cruschelli, P., (eds.): SmartenIT Deliverable 1.2 – Cloud Service Classifications and Scenarios, October 2013

7. Burger, V. (ed.): SmartenIT Deliverable 2.2 – Definitions of Traffic Management Mechanisms and Initial Evaluation Results, October 2013

8. Hausheer, D., Rückert, J. (eds.): SmartenIT Deliverable 3.1 – Initial System Architecture, April 2013

9. Lareida, A., Bocek, T., Waldburger, M., Stiller, B.: RB-tracker: A fully distributed, replicating, network-, and topology-aware P2P CDN. In: IFIP/IEEE International Symposium on Integrated Network Management (IM 2013), Ghent, Belgium, pp. 1199–1202, May 2013

10. Schwartz, C., Hoßfeld, T., Lehrieder, F., Tran-Gia, P.: Angry apps: the impact of network timer selection on power consumption, signalling load, and web QoE. J. Comput. Netw. Commun. **2013**, Article ID. 176217, 13 pp. (2013). doi:*10.1155/2013/176217* *(http://dx.doi.org/10.1155/2013/176217)*

11. Reichl, P.: From charging for quality of service to charging for quality of experience. Ann. Telecommun. **65**(3–4), 189–199 (2010)
CrossRef *(http://dx.doi.org/10.1007/s12243-009-0144-8)*

12. Stiller, B., Hausheer, D., Hoßfeld, T.: Towards a socially-aware management of new overlay application traffic combined with energy efficiency in the internet (SmartenIT). In: Galis, A., Gavras, A. (eds.) FIA 2013. LNCS, vol. 7858, pp. 3–15. Springer, Heidelberg (2013)
CrossRef *(http://dx.doi.org/10.1007/978-3-642-38082-2_1)*

13. Hoßfeld, T., Hausheer, D., Hecht, F., Lehrieder, F., Oechsner, S., Papafili, I., Racz, P., Soursos, S., Staehle, D., Stamoulis, G.D., Tran-Gia, P. Stiller, B., Hausheer, D.: An economic traffic management

approach to enable the TripleWin for users, ISPs, and overlay providers. In: Tselentis, G., et al. (eds.) FIA Prague Book – Towards the Future Internet - A European Research Perspective, pp. 24–34. IOS Press Books (2009)

14. Fiedler, M., Hossfeld, T., Tran-Gia, P.: A generic quantitative relationship between quality of experience and quality of service. IEEE Netw. Spec. Issue Improving QoE Netw. Serv. **24**(2), 36–41 (2010)

About this Chapter

Title

Socially-Aware Management of New Overlay Applications Traffic - The Optimization Potentials of the SmartenIT Approach

Book Title

Mobile Networks and Management

Book Subtitle

6th International Conference, MONAMI 2014, Würzburg, Germany, September 22-26, 2014, Revised Selected Papers

Pages

pp 290-300

Copyright

2015

DOI

10.1007/978-3-319-16292-8_21

Print ISBN

978-3-319-16291-1

Online ISBN

978-3-319-16292-8

Series Title

Lecture Notes of the Institute for Computer Sciences, Social Informatics and Telecommunications Engineering

Series Volume

141

Series ISSN

1867-8211

Publisher

Springer International Publishing

Copyright Holder

Institute for Computer Sciences, Social Informatics and Telecommunications Engineering

Additional Links

- *About this Book*

Topics

- *Computer Communication Networks*
- *Information Systems Applications (incl. Internet)*
- *System Performance and Evaluation*

Keywords

- Application-layer traffic optimization

- Economic traffic management
- Social networks
- QoE
- Energy efficiency
- Inter-cloud communications

Industry Sectors

- *Pharma*
- *Automotive*
- *Chemical Manufacturing*
- *Biotechnology*
- *Electronics*
- *IT & Software*
- *Telecommunications*
- *Consumer Packaged Goods*
- *Aerospace*
- *Oil, Gas & Geosciences*
- *Engineering*

eBook Packages

- *Computer Science*

Editors

- *Ramón Agüero* (15)
- *Thomas Zinner* (16)
- *Rossitza Goleva* (17)
- *Andreas Timm-Giel* (18)
- *Phuoc Tran-Gia* (19)

Editor Affiliations

- 15. University of Cantabria
- 16. University of Würzburg
- 17. Technical University of Sofia Faculty of Telecommunications
- 18. Hamburg University of Technology
- 19. University of Würzburg

Authors

- *Krzysztof Wajda* (20)
- *Rafał Stankiewicz* (20)
- *Zbigniew Duliński* (20)
- *Tobias Hoßfeld* (21)
- *Michael Seufert* (21)
- *David Hausheer* (22)
- *Matthias Wichtlhuber* (22)
- *Ioanna Papafili* (23)
- *Manos Dramitinos* (23)
- *Paolo Cruschelli* (24)
- *Sergios Soursos* (25)
- *Roman Łapacz* (26)
- *Burkhard Stiller* (27)

Author Affiliations

- 20. AGH University of Science and Technology, al. Mickiewicza 30, 30-059,

Kraków, Poland

- 21. University of Würzburg, Würzburg, Germany
- 22. TU Darmstadt, Darmstadt, Germany
- 23. Athens University of Economics and Business, Athens, Greece
- 24. Interoute, Pisa, Italy
- 25. Intracom SA Telecom Solutions, Athens, Greece
- 26. Poznan Supercomputing and Networking Center, Poznań, Poland
- 27. University of Zürich, Zürich, Switzerland